

Effects of Stream Restoration on Sediment, Macroinvertebrates, and Fish



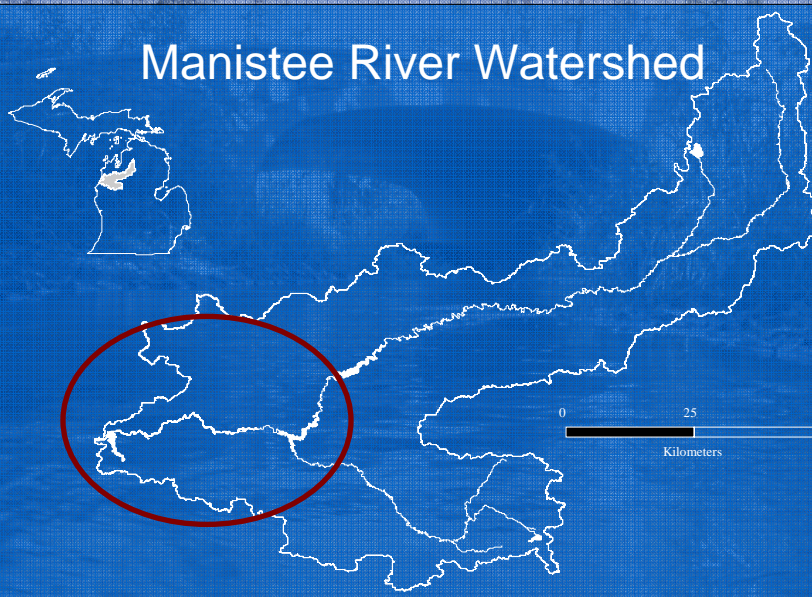
Stephanie Ogren
Aquatic Biologist

Marty Holtgren
Fish Biologist

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Manistee River Watershed



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Watershed Program Goals



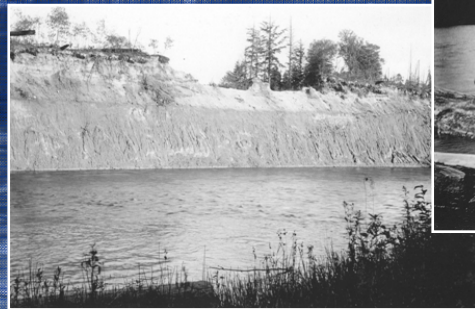
- Maintain “good” water quality
- What are effective restoration techniques?

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Concerns in the Watershed

- Historical Sediment
– Rollways



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Concerns in the Watershed

- Current Sediment
 - Road-Stream Crossings
 - Stream banks

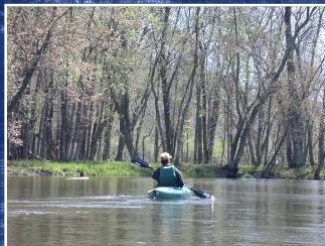


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Concerns in the Watershed

- High Recreational Use



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Important Players

- Species of Concern



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Partnerships

- EPA
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- Great Lakes Fisheries Trust
- Lower Manistee River Partnership
- Bear Creek Watershed Association
- Conservation Resource Alliance
- Numerous Universities
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Study Projects

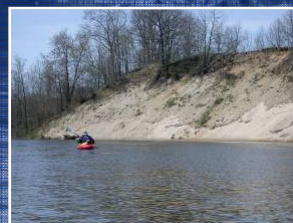
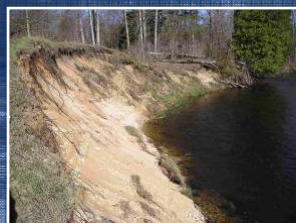


- Road-Stream Crossings (4) +1

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Study Projects



- Stream Bank Stabilizations (4)

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Study Projects

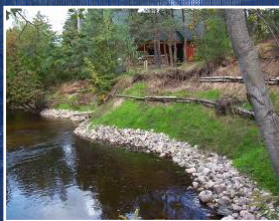


- Recreational Access Projects (3)
- Sturgeon Spawning Site Reclamation (1)

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Practices Implemented



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Practices Implemented



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Monitoring

- Document Results!
 - Are these standard restoration practices producing the desired result?



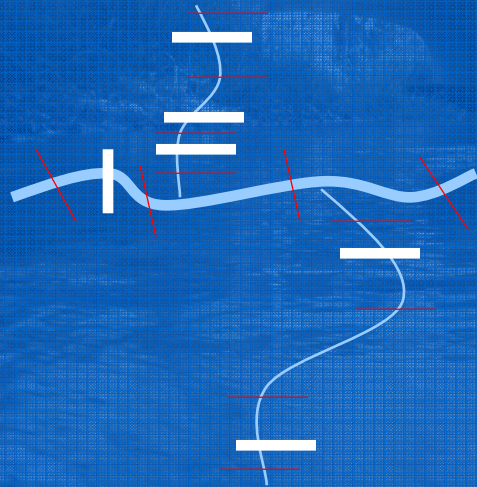
- Chemistry
- Nutrients
- Biology
 - Macroinvertebrates
 - Fish
- Habitat
 - Substrate

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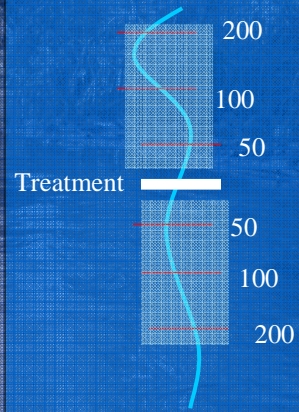


Monitoring at Multiple Scales

Watershed Response



Site Response



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Methods

- Standard methods
 - Hydrolab
 - Sediment
 - Pebble Count
 - Core Samples
 - Depth of Fines
 - Macroinvertebrates
 - Surber Samples and Kick Net
 - Fish Community
 - 2 Pass Electrofishing

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Monitoring

- Grand Valley State University
- Five Graduate Students

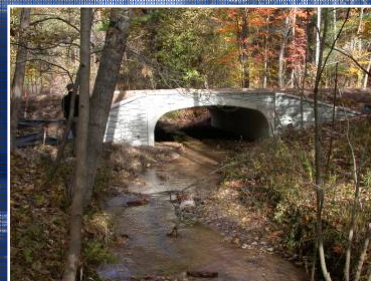


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Case Study

- Sickie Creek
 - Smallest site
 - Fastest response
 - Long term data set

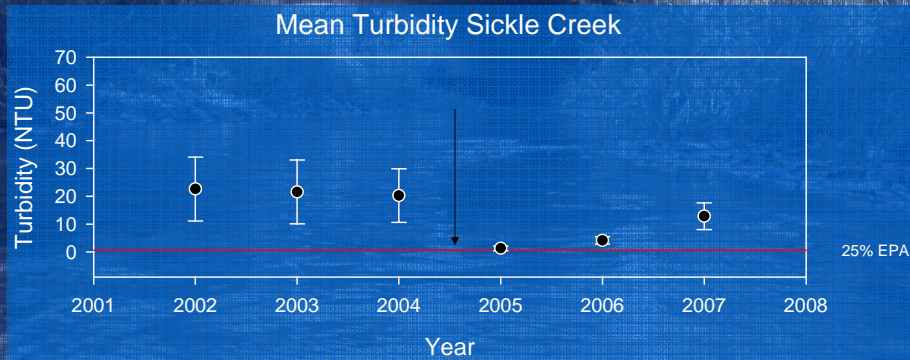


- Forest Service
 - Showcase site

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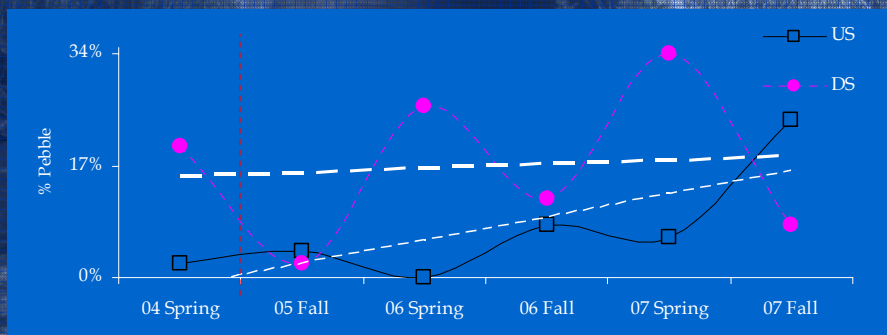
Sickle - Turbidity



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Sickle - Pebble Count



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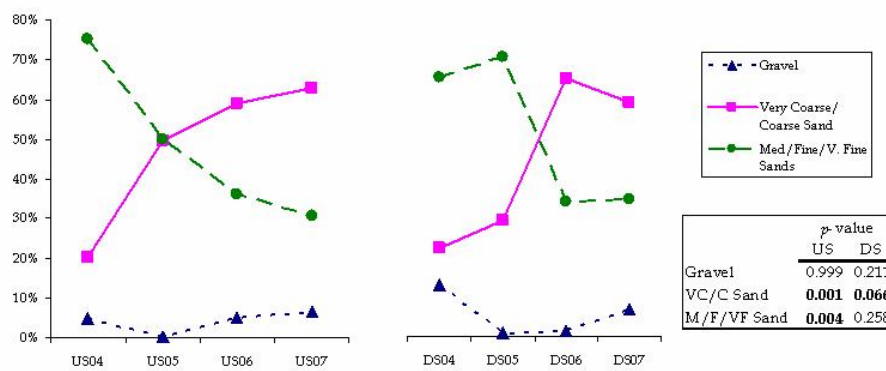
Sickle - Depth of Fines

Transect	2004	2005	2006	2007	mean pre	mean post	SE	difference (post-pre)
US3	47.9	29.1	51.4	24.8	47.9	35.1	6.7	-27%
US2	65.5	36.3	57.2	22.7	65.5	38.7	9.8	-41%
US1	47.3	28.5	21.3	22.2	47.3	24.0	6.0	-49%
DS1	26.3	64.3	60.4	61.5	26.3	62.1	9.0	136%
DS2	53.1	38.7	44.2	28.4	53.1	37.1	5.2	-30%
DS3	115.0	83.1	118.8	59.1	115.0	87.0	14.1	-24%
							average	-6%

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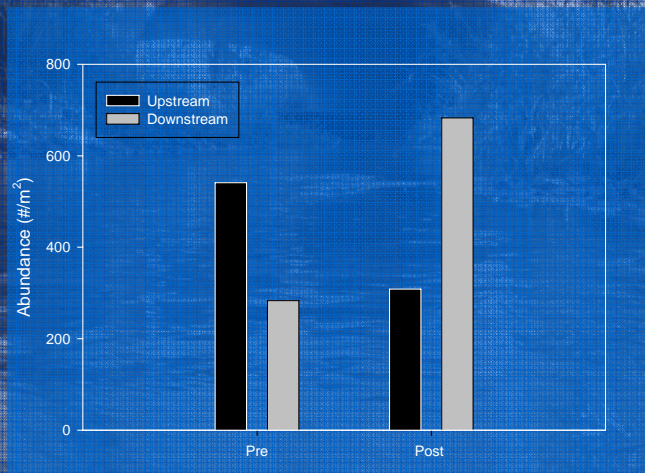
Sickle – Sediment Cores



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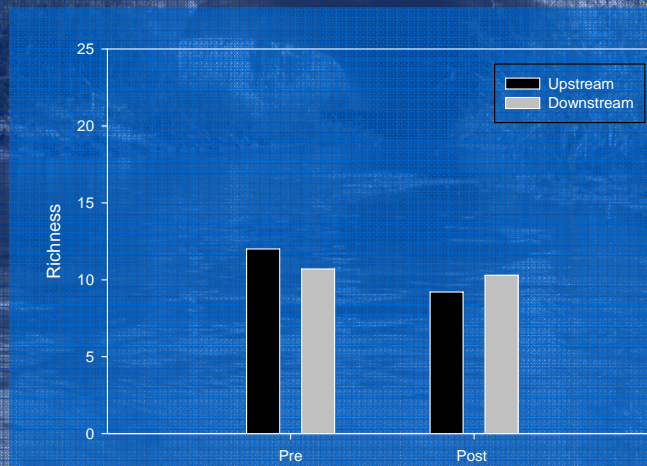
Sickle – Macroinvertebrate Abundance



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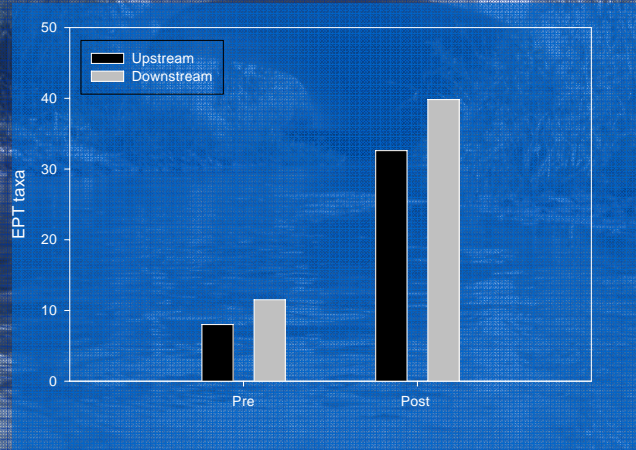
Sickle – Macroinvertebrate Richness



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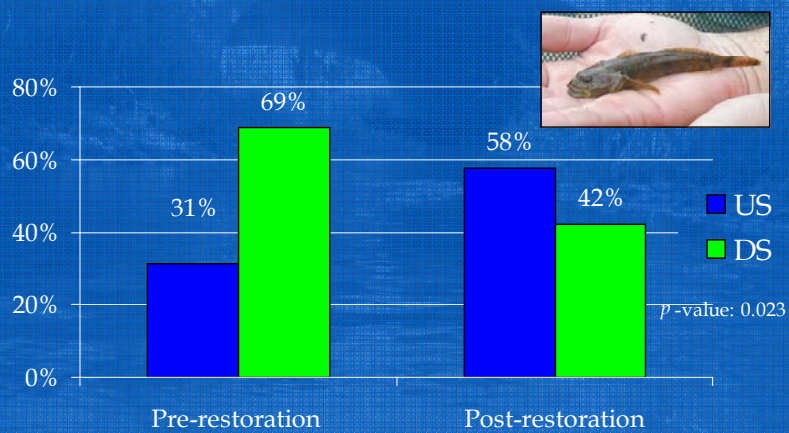
Sickle - EPT



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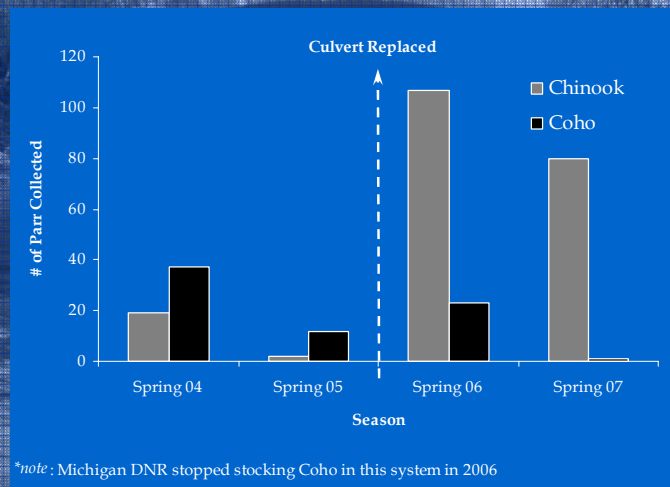
Sickle – Sculpin



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Sickle – Salmon Parr Response

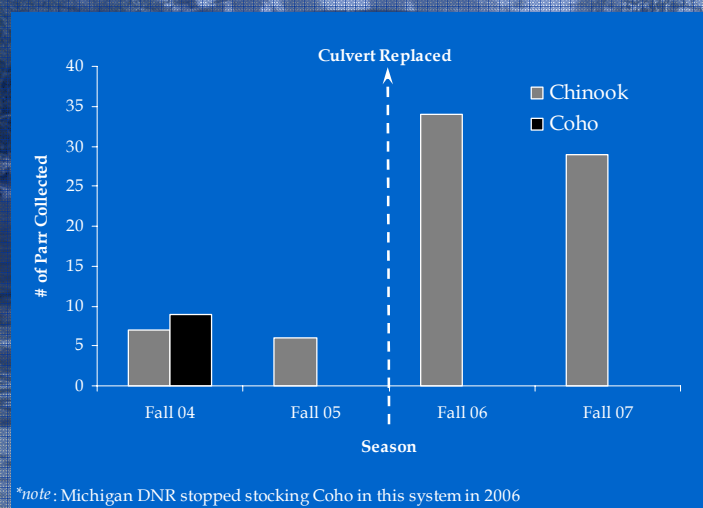


*Upstream and Downstream Sites Combined

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Sickle – Salmon Parr Response



*Upstream and Downstream Sites Combined

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Sickle Summary

- Sand pulse moving through system
- Overall increase in larger substrate
- Increase in EPT
- Shift in fish community
- Increase in salmon parr

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General Trends

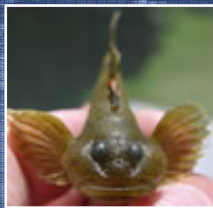
- | | |
|---|---|
| <ul style="list-style-type: none">• Road Crossings<ul style="list-style-type: none">– Upstream sand buildup*Restoration activity– Upstream positive response– Downstream negative response (initially) | <ul style="list-style-type: none">• Stream Banks<ul style="list-style-type: none">– Downstream sand buildup*Restoration activity– Downstream positive response– Upstream relatively stable |
|---|---|

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Future Needs

- Metric Concordance
 - Biological vs. Physical
 - Ex: 3 ways to look at sediment
 - GVSU Annis methodology test sites



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Lessons Learned



- Construction
- Land Owners
- Partners
- Graduate Students

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Thank You



Dr. Eric Snyder

April Wright

Nichol DeMol

Nick Gressick

Jason DeBoer

Kris Nault

Forest Service Staff

Conservation Resource Alliance

Bear Creek Watershed Council

Lower Manistee Watershed Partnership

Manistee County Road Commission

LRBOI Staff

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Questions



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